The greatest service which can be rendered any country is to add [a] useful plant to its culture . . .

Thomas Jefferson

American President/Author (1743–1826)

Forum

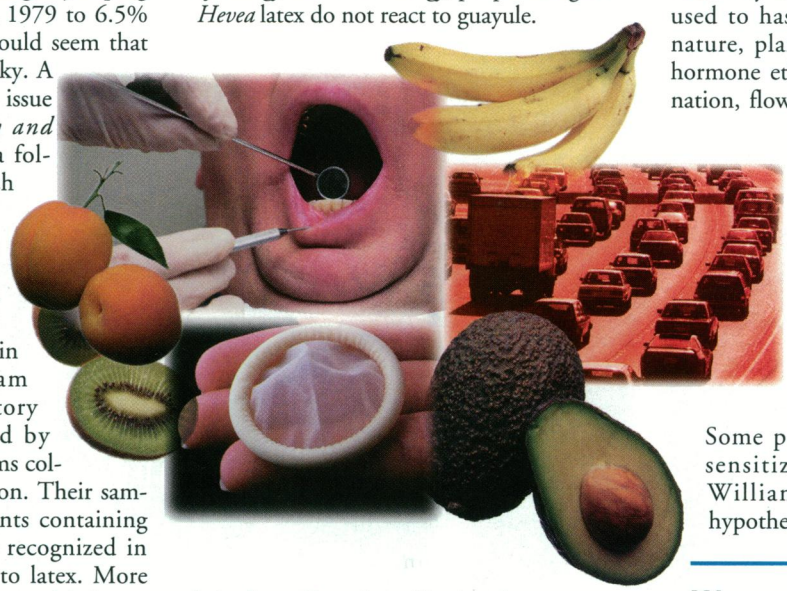
Latex Allergies Stretch Beyond Rubber Gloves

With the number of latex allergies jumping from a single case report in 1979 to 6.5% of Americans in 1994, it would seem that latex is dropping from the sky. A report in the January 1995 issue of the *Journal of Allergy and Clinical Immunology* and a followup article in the March 1996 issue of *Chest* find that urban air does contain latex particles, shed into the environment by normal tire wear.

Along a four-lane road in Denver, Colorado, a team from the Allergy Respiratory Institute of Colorado led by immunologist Brock Williams collected particulate air pollution. Their samples included black fragments containing latex proteins, which were recognized in tests by human antibodies to latex. More than half (58%) of the airborne debris was small enough to be inhaled into the lungs. Airborne latex could partially explain the rise in latex sensitization. "Until we know more about it," says Williams, "it's difficult to weigh the importance of airborne latex to the overall problem. But it's probably in every city in the world with cars."

Proteins in the sap of the Brazilian rubber tree (*Hevea brasiliensis*)—used to produce latex—trigger latex allergies ranging from annoying skin rashes to anaphylactic shock. The surge in latex allergies coincided with increased global demand for latex gloves in the late 1980s to prevent the spread of HIV and hepatitis. Manufacturing shortcuts, such as skipping washing steps that remove latex proteins, contributed to the epidemic that first struck medical personnel exposed to latex-containing supplies. Recent studies find that latex allergies affect up to 14% of healthcare workers.

Because 57 latex proteins are known allergens, removing them is impractical. So is avoiding rubber, which is found in 40,000 items, including 300 medical products. To circumvent latex allergies, USDA researchers at the Western Regional Research Center in Albany, California, have developed hypoallergenic rubber from guayule (*Parthenium argentatum*), a shrub native to the southwestern United States. In clinical trials to be published in the *Journal of Allergy and Immunology*, people allergic to *Hevea* latex do not react to guayule.



Latex in our lives. A combination of exposures to proteins found in latex products and certain foods may be the cause of a rise in latex allergies.

The USDA team, headed by plant physiologist Katrina Cornish, created processing methods to extract guayule and manufacture rubber products with superior resilience, strength, and elasticity. The USDA granted an exclusive license for the patented technology to American Medical Products in Burlingame, California. The first guayule products will be medical supplies for latex-sensitive patients and medical workers. Cornish is continuing genetic studies to improve latex yields and adapt guayule for growth in diverse climates.

Up to half of latex-sensitive patients also show allergic reactions to certain fruits including avocados, bananas, kiwifruits, papayas, and peaches, according to a study published in the October 1994 issue of the *Annals of Allergy*. "These plants contain the same proteins that are allergens in latex," says Dennis Ownby, director of pediatric allergy research at Henry Ford Hospital in Detroit, Michigan. People with fruit allergies should warn physicians before undergoing procedures, he says, because anaphylactic reactions from contact with physicians' latex gloves have occurred in those with mild fruit allergies.

Williams, now director of research at IBT Reference Laboratory in Lenexa, Kansas, theorizes that this fruit/latex cross-reactivity is worsened by ethylene, a gas used to hasten commercial ripening. In nature, plants produce low levels of the hormone ethylene, which regulates germination, flowering, and ripening. But when forced to ripen quickly under high ethylene concentrations, plants produce allergenic wound-repair proteins, which are similar to wound-repair proteins made during the tapping of rubber trees. Sensitive individuals who ingest the fruit "get a higher dose and worse reaction," suggests Williams. Some people may even first become sensitized to latex through fruit, Williams suggests, although this hypothesis remains to be proven.

Women's Health Initiative

Attempting to make up for the historic exclusion of women from clinical research, Bernadine Healy, then head of the National Institutes of Health, launched the Women's Health Initiative (WHI) in 1991. The WHI is an ambitious effort to evaluate several strategies aimed at preventing heart disease, breast and colorectal cancer, and osteoporosis in postmenopausal women.

The initiative is divided into three parts. The first part encompasses three clinical trials evaluating the benefits of a low-fat diet, hormone replacement therapy, and calcium and vitamin D supplementation, respectively.

The second part of the initiative, an observational study, runs simultaneously with the clinical trials. Participants are followed for 8 to 12 years while investigators track a wide range of factors to determine the relationship of these variables to disease outcome. Participants regularly fill out questionnaires on items such as diet, environmental exposures, exercise, and smoking. In addition, clinics store participants' blood samples for later evaluation. Both the clinical and observational studies began recruiting volunteers in 1993.

The third part of the study, a collaborative venture with the Centers for Disease Control and Prevention (CDC), funds a variety of disease prevention programs at several university-based centers nationwide. With the particular goal of including women of diverse races and lower socioeconomic status, these projects focus on such issues as improving delivery of diabetes care, reducing cardiovascular risk among black women, and measuring physical activity in women. This arm of the initiative began in 1995 and will run on a five-year funding period.

To date, approximately 65,000 women have enrolled in the observational and clinical trials at 40 centers around the country. The director of the initiative, Loretta Finnegan, says the investigators aim to have 164,500 participants by 1998. The study will be completed in 2005, at which point researchers will analyze data. They expect to provide results by 2007.

This is the largest study of women ever undertaken and the numbers involved can become overwhelming. To manage the project on all levels, the NIH established one central coordinating center in Seattle, Washington. Staff at the center manage all data from that location, aided by a computer network. "All of our sites are connected all the time by a network," explains Garnet Anderson, a project director for data coordination at the center. Thus, Anderson can freely access data from all 40 clinical centers.

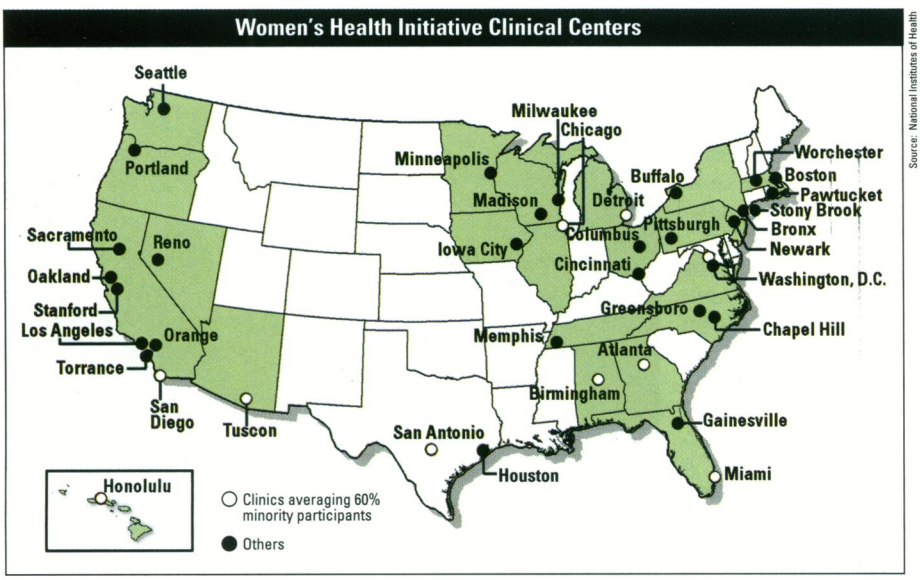
Because the initiative extends over such a long period, the scientists must continually reevaluate the research protocol and integrate new data as they become available. Judith Ashley, a study investigator and assistant professor in the Department of Medicine at University of California at Los Angeles, is impressed with the adaptability built into the study. As an example, when recent research results indicated that women who have not had a hysterectomy should not take estrogen without progesterone because of increased incidence of cervical dysplasia, the investigators responded quickly and changed the study design.

The WHI is approximately one-third of the way through its projected life span. So far, outside organizations are optimistic about the project. "We are pleased that NIH is taking on a comprehensive study of women's health," said Lisa Cox, program director for the National Women's Health Network, a public interest group devoted to giving women a stronger voice in the nation's healthcare system. "We hope the study will finally provide answers to questions that have been posed for a very long time—questions such as the relationship between hormone replacement therapy and breast cancer."

According to Luella Klein, director of women's health issues for the American College of Obstetrics and Gynecology, the initiative has already provided benefits by calling attention to gender in research. "Partly because of the uproar that was generated [before the creation of the WHI, when the NIH realized that only about 13% of research funding was going to female-specific research], there are data now coming out that never would have come out before, because nobody ever bothered to divide data by men and women."

While Klein is enthusiastic about the initiative, she voices concern about its size. In this time of budget cuts, such a mammoth endeavor makes an easy target. Klein says she has seen other large studies discontinued prematurely and worries that the WHI could be another victim. "I hope they make it to the end and that modifications are made as needed," she said.

Since 1993, women ranging in age from 50 to 79 have been signing up to participate in this landmark study. Many may not live to see the final results. But as Ashley comments, "They're concerned about their children and their grandchildren. They [participate in] the examinations and the trial because they care about themselves and other women."



National Strategy on Endocrine Disruptors

Mounting scientific evidence and recent media attention have heightened public awareness about endocrine disruptors, chemicals that mimick or interfere with the actions of hormones. Exposures to high doses of these chemicals, such as organochlorine compounds including DDT, PCBs, and dioxins, can be strongly associated with declines in offspring, increases in cancers, and reductions in reproductive functions in wildlife and humans. Because the various research projects on endocrine disruptors conducted by federal agencies lack cohesion, the government is working to coordinate and integrate research needs and goals.

The White House Office of Science and Technology Policy's Committee on Environment and Natural Resources (CENR) has created an interagency task force to develop a national strategy for research on endocrine disruptors. The goals of the working group include identifying key scientific questions about endocrine disruptors; developing an inventory of current federal research programs on endocrine disruptors; identifying research gaps in ongoing programs and assessing research needs to facilitate coordination across the federal government; initiating outreach efforts to public interest, private sector, and international groups; and promoting educational activities to disseminate information to the scientific community. The working group is chaired by Lawrence Reiter, director of the EPA's National Health and Environmental Effects Research Laboratory. George Lucier, director of the Environmental Toxicology Program of the NIEHS, serves as vice chair for human health and Michael Mac, program manager for status and trends for the National Biological Survey of the Department of the Interior, serves as vice chair for ecology.